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tv horizons



The Professional Television Journal

IN THIS ISSUE

The Company Seminar and CATV
Television Horizons Visits AMECO
NOISE and How to Treat It

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that makes the
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in our town!



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GEORGIA ASSOCIATION OF BROADCASTERS

One of the most interesting stories of the year is bound to come forth from the proposed Southeast Radio-TV Seminar, scheduled to meet October 16th at Atlanta, Georgia.

Topic of the GAB sponsored seminar will be: CATV - Friend or Foe? The actual subjects to be discussed will encompass all phases of CATV, good and bad, according to Mr. Raymond E. Carow of WALB-TV and Chairman of the meeting.

The interest in this seminar has been intense, partly due to prior publicity. As an indication of the importance of the meeting, the following have accepted invitations to attend: William Dalton, President, NCTA; Hollis Seavey, Assistant for Governmental Affairs, NAB; R. Russell Eagan, Washington attorney; Kenneth A. Cox, Chief, FCC Broadcast Bureau.

Those slated to appear on behalf of the CATV industry include Mr. Charles Batson, Vice President and Managing Director of WIS-TV, Columbia, South Carolina, a man who himself is involved in CATV operations.

Mr. Ben Williams, Executive Vice President of WTOG-TV, Savannah, Georgia, will speak against CATV. Currently, a \$1,200,000 system is being constructed on Mr. William's home ground. Also invited to attend is Congressman Kenneth Roberts, member of the House Committee on Foreign and Interstate Commerce.

The setting for the seminar may or may not be advisable, however, the meeting is scheduled to begin immediately after the NAB's fall conference which is being held in the same locale on the same dates. Mr. Carow stated, "Everyone attending the NAB meeting plus broadcasters from all over the country are welcome to the CATV discussion."

Those of the CATV industry who desire to attend the seminar should contact Mr. Raymond E. Carow, 24 Ivy Street, Atlanta, Georgia. Place of the meeting will be the

CATV
MATV
Fringe TV
ETV
UHF-TV
Associated
Industries' News

Dinkler-Plaza Hotel, Atlanta. The meeting will convene at 1:30 P.M., on October 16th. Registration fee is \$10 to cover costs for a social hour and final transcripts.

HARMON APPOINTED AS R & D ENGINEER

Mr. Bruce Merrill, President of AMECO, Inc., announced the appointment of Mr. C. Edward Harmon to the post of Research and Development Engineer.

Mr. Harmon who is a specialist in the design of transistorized amplifiers, power supplies and semiconductor switching devices, will devote himself to further development and expansion of the company's new line of transistorized equipment.

PASCO-KENNEWICK SYSTEM SOLD

Columbia Television Company of Pasco-Kennewick, Washington, was just recently sold to a purchasing group headed by Mr. Robert M. Rosencrans, former Director of the CCTV Division at TelePrompster Corporation. Currently, the number of subscribers on the Pasco-Kennewick system totals 3400 with an expansion potential of 10,000. Mr.

Clay D. White, General Manager of the system stated that they anticipate this coverage within the next five years.

In commenting on the purchase, Mr. Rosencrans stated their long range goal was "to augment the services already available to subscribers by the transmission of additional television signals into the area as well as the transmission of other forms of home entertainment, information and education."

The exact purchase price involved in the transaction was not disclosed.

HELENA CATV SYSTEM

Helena TV Cable, Inc., has been sold to Paul B. McAdam, Livingston, Montana CATV operator. The 2600 subscriber system will be named Helena Television under the new firm.

TELCO WIRE MILEAGE

The Internal Revenue Service has ruled that microwave radio transmission service furnished by a telephone company to a CATV system from the point of off-the-air pickup to the CATV's receiving terminal is wire mileage service for the purpose of communications excise taxes under the IRS code.

GARFIELD LEAVES JERROLD

Zalmon H. Garfield has resigned his position as Assistant to the President of The Jerrold Corporation.

Mr. Garfield, an authority in the fields of CATV and pay TV, is going to become an independent business management consultant effective October 1, 1962.

In commenting on the loss of Mr. Garfield, Sidney Harman, Jerrold's president, stated "We regret that we will lose Mr. Garfield's participation in the day-to-day operations of the company, but we are pleased that, through his consulting activities, we will be able to have the benefit of his knowledge and experience in selected areas." Also he added that Jerrold was the first clients of an independent

TELEVISION HORIZONS

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EDITORIAL

It is sincerely hoped that the Georgia Association of Broadcasters proposed Southeast Radio-TV Seminar will indeed be fruitful. However, we can not but wonder if those from the NAB's side of the board who are bitter opponents of CATV will truly proceed with an open mind.

Presently, the actual environment in the Southeast is not particularly favorable towards the CATV industry. Why? They have already heard a great deal about CATV from such people as Mr. Dan W. Shields and nothing from the CATV industry. The assumption that an open mind can exist in a somewhat biased surrounding isn't necessarily so.

The so-called differences of opinion on the CATV system in a one station market will most assuredly be brought up time and time again at the meeting. This is only natural since these people are the ones who contend they are suffering. How about the suffering of those who are in some cases subjected to poor programming, third rate film and very few good network shows? The public is provided this type of fare by some of the small stations who defend their practice with the blanket statement that they don't have the budget.

Why have the CATV systems been successful in obtaining subscribers if everyone is happy? The fellow in "gee-whiz" U.S.A., is the same fellow who in New York City or Chicago enjoys a variety of fare. In his own home town he must be content with what is available. The CATV system simply provides him with the same commodity that a great number of cities provide.

If the trouble lies in the economic structure of the small station, then someone will have to re-evaluate the practicability of continuing operation. Too long the public has been deprived of good television and been kept in ignorance of what could be done.

RLM

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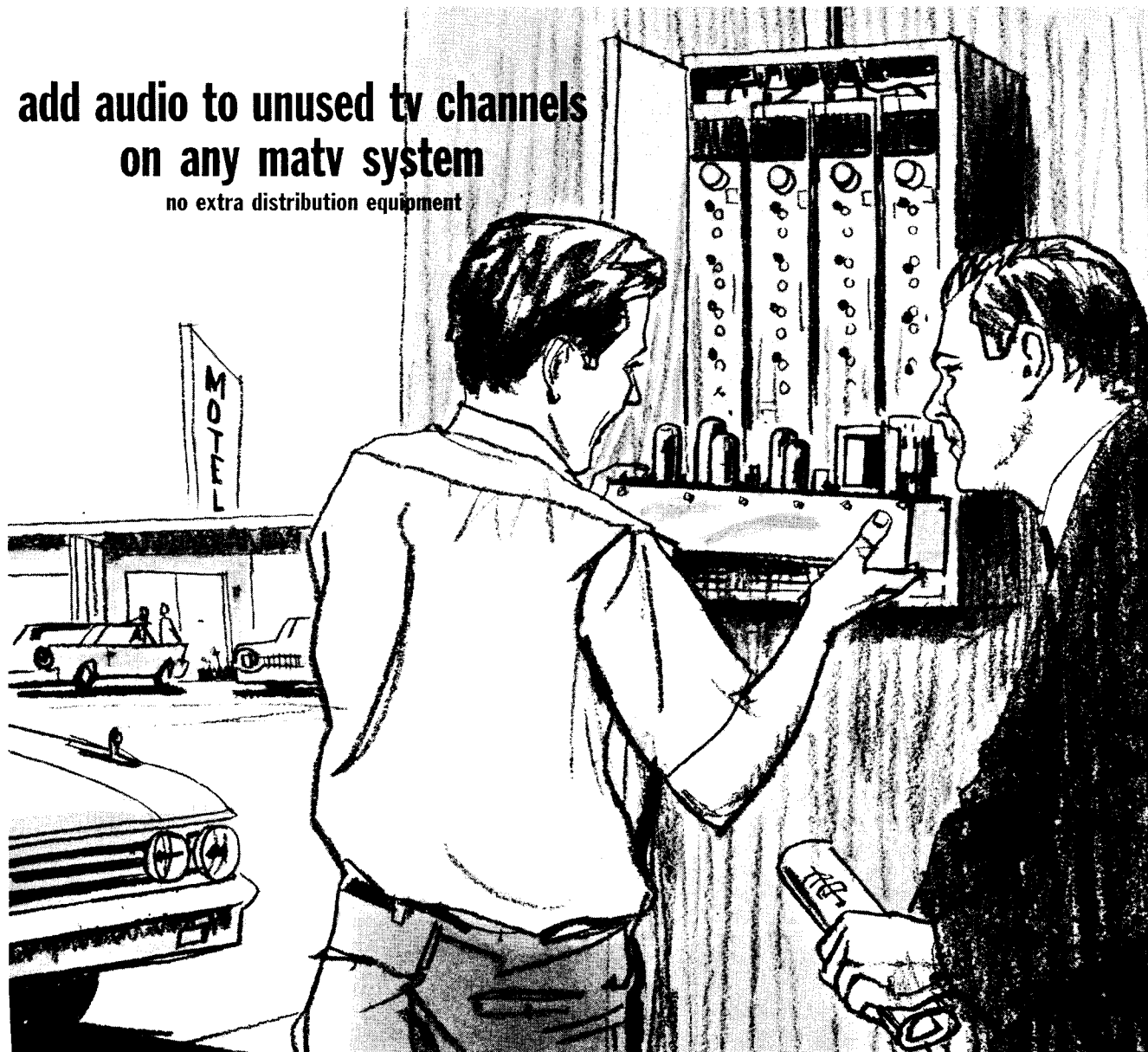
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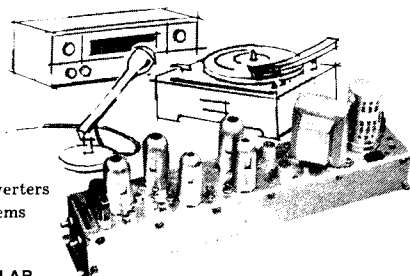
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THE COMPANY SEMINAR AND CATV

**By Charles Wigutow
TVH Contributing Editor**

How many of us have wanted to 'get away from it all' to enable some honest concentration. Most everyone has had this feeling from time to time. It is based simply on the knowledge that one's ability to think clearly is improved when some relief from the everyday hum-drum of business activity is present.

The Managers of the H & B Communications Corporation who gathered together in scenic, cultural Aspen, Colorado can attest to the workability of this idea. The reason for their gathering at Aspen was to conduct a company management seminar, away from the demanding pressures of modern business.

A get-together of this kind offers renewal of close ties with fellow managers and the main office staff. It allows for a feeling of being essential by contributing to the thinking and planning of the company. It is a chance to catch up with what is current in the industry and at headquarters.

The seminar is indeed a series of concentrated learning sessions. The questions brought up are the substance of the manager's daily work lives. There is much to contribute, confirm or dispute. A seminar type meeting is a chance for the individual mind to expand, to be stimulated by thoughts from others and for each person to act as a stimulating agent to his associates. Undeniably there is a great satisfaction in feeling that one is an essential part of a creative process.

The optimum timing of such a national seminar seems to be about the end of the old fiscal year and the beginning of the new one. H & B had an additional bonus inasmuch as the national NCTA convention had been held only one week earlier and provided extra food for thought.

Organizing this type of meeting should proceed along such lines as will provide an air of leisure. It is well to remember that people coming from all corners of the country cannot always arrive on split-second schedules. An allowance over a weekend for early comers and stragglers should be made to provide a good buffer between the busy office routine and the required clear mindedness one must have for the coming sessions. For those who are able to combine a vacation and business in one trip, this is a good time to bring the wife and family.

A Sunday dinner for all can be planned to provide a friendly meeting ground for old friends and associates who haven't seen each other for a year as well as provide a time for reminiscences, gossip, what has happened since the last get-together, and even the airing of some individual gripes. The condition of a pleasant atmosphere is an ideal place, from a company's viewpoint, to let them be vented.

Business sessions begin at 9 A.M., the following morning. A full roster of topics for the seminar can be prepared well in advance by seeking out from the various management personnel, their wishes and opinions on various subjects they would like to discuss. In the case of the H & B seminar, the meetings began in natural one, two, three order. Leon N. Papernow, Vice President in charge of Operations, reviewed the year 1961 from the time of the San Francisco NCTA convention to the present date.

A report on the Washington convention covered the organizational, business and technical aspects. These were presented by the men assigned to do this job; John Campbell, Charles Wigutow and Wayne Aylward. Details on future activities were filled in by Don Atwell, overall Systems Manager and others who were responsible for shaping these plans. The accounting department explained the mechanics of a new billing and accounting system and invited the various managers, who had gone through other billing procedures, to point out any of the weaknesses or strong points.



The beautiful city of Aspen, Colorado. Noted for its summer conference activities and winter sports, this picturesque community lies snuggled amongst the mountains and trees.

The remainder of the week was given over to general office practices, advertising, public relations, broadcaster relations and the technical end. In addition; music, FM, weather information and closed-circuit TV was discussed at some length. The last day was left open to the manufacturers. Each manufacturer's representative was given an hour for discussion of their various products.

Indeed it was a pleasant and profitable week. It demonstrated perfectly that the company management seminar fits into the organizational plans of any company having scattered and even isolated branches. Certainly, one must agree that a great deal can be learned from others who face allied situations.

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Television Horizons visits AMECO

—Staff Extra—

Late in August a TVH staff member had the opportunity to spend a few hours touring the rapidly growing communications complex of Bruce Merrill, Antennavision-AMECO in Phoenix, Arizona. The experience was an enlightening one, and the rapid strides this firm is making in the industry of closed circuit video distribution, and associated services, is nothing short of remarkable.

The Antennavision complex originally consisted on a good chunk of outlying Arizona towns, wired for off-the-cable television reception by Merrill's crews. Recently a portion of the original CATV complex was sold to Video-Vumore Company, and the Antennavision CATV complex expanded west into the Imperial valley of southern California.

In the same period of time the Antennavision manufacturing arm, AMECO, has expanded rapidly so today it supplies amplifiers, head end equipment and drop items to not only its own extensive network of systems but also to other systems on a manufacturer to system basis.

As a part of this manufacturer to system sales and development program AMECO has recently gone through expansion pains similar to those experienced by any growing firm. Additional management and engineering personnel, an expanded production line and increased warehouse facilities are all a part of the expansion program at AMECO.

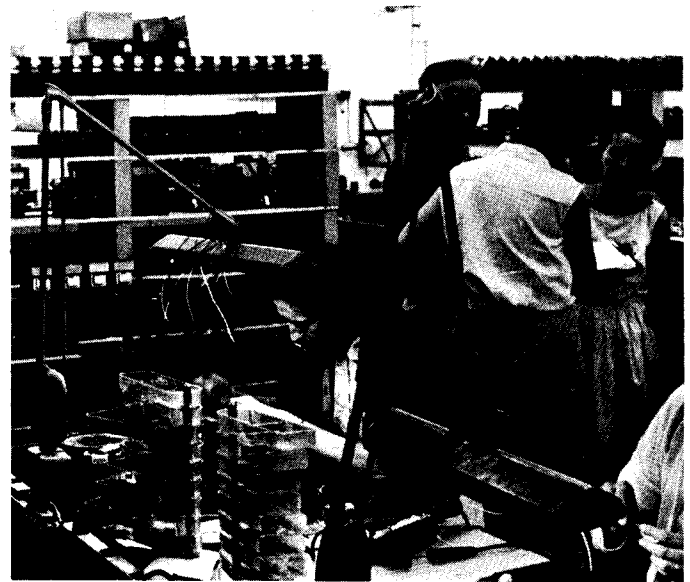


AMECO amplifiers, splitters and the 101 other CATV units start here in the metal stamping room.

In Phoenix, proper, AMECO has recently installed a test environmental captive CATV system behind a butte which shields a small but very

— Staff Extra —

wealthy section of a Phoenix suburb from the direct reception of the five Phoenix area stations. The small system (less than 50 subscribers) presents a unique opportunity to develop not only new transistorized equipment under field conditions, it also offers AMECO an opportunity to human-test something that a number of CATV management people have been wondering about for some time.



Tight production line control with a roving quality control engineer always on the move keeps the AMECO production line workers on their toes at all times.



Parts distribution and the beginning phases of equipment construction start here at this part of the production line.

Meanwhile, back at the plant, the AMECO manufacturing complex is very heavily engaged in preparing equipment for the Santa Barbara, California CATV system, which when completed, will be among the largest and most complex in the world. The Santa Barbara system will include provisions for switching the local Santa Barbara station's signal (KEYT - channel 3) into any one of the three Los Angeles network channels (2, 4, 7). This will preserve the identity of the local station and at the same time maintain the KEYT signal as the one the viewers will be watching (in lieu of the Los Angeles station which happens to be carrying the same network program at the same time).



From the production line to a test set up and alignment, every unit gets a complete cook-in before heading for the stockroom at AMECO.

In Phoenix, the local residents know AMECO - Antennavision as the local promoters of the Championship boxing bouts. The recent bout was carried on big screen TV at the local fair grounds. AMECO approached this as a business opportunity and set about promoting the fight on local radio, through local newspapers and civic organizations.

AMECO CATV manufacturing interest currently is all entwined in transistors. Ed Whitney reports that he has, during the past few months, heard from nearly every CATV operator in the country with requests for 2 to a half dozen transistorized units. Apparently, says Whitney, CATV operators are anxious to prove to themselves that transistors are here now and do indeed work in CATV applications.

Enough of the trials have turned into large scale purchases that the AMECO plant is working overtime to keep up with the demands of the industry.

The future for AMECO is, Whitney feels, in transistorized equipment. In fact, he notes, the industry itself will soon find itself almost 100 percent transistorized. And its on this eventuality that AMECO is banking.



Finished amplifiers — ready for testing line the shelves at one end of the production line facility.



Microwave from Motorola, nearly \$250,000 worth, awaits FCC OK for installation. Ed Whitney says this equipment will be used in the extensive Antennavision Imperial Valley (California) CATV complex now under construction by Ameco.

IMPROVING

SYSTEM PERFORMANCE

NOISE and How To Treat It

—Russ Miller, Managing Editor, Television Horizons—

INTRODUCTION

A long time back someone discovered that the objectionable element, noise, went hand in hand with weak signals. Ever since then people have been seeking ways and means to get rid of noise. But, so far no effective means has yet been devised to totally combat it. A great deal of improvement has come about the past few years and consequently the effects and some of the causes of noise have been lessened.

Actually the subject of noise envelops such a broad field that it becomes difficult to discuss. It is much easier to deal with it in terms that are familiar to all of us, however.

Noise as we know it appears as "snow" in the television system. Unless the system is in poor shape or inadequately designed, the general source of noise is confined to the first stages of the receiving equipment. The logical sequence would be to actually pin down the specific items which cause or contribute to the generation of noise voltages.

THE OUTLAW

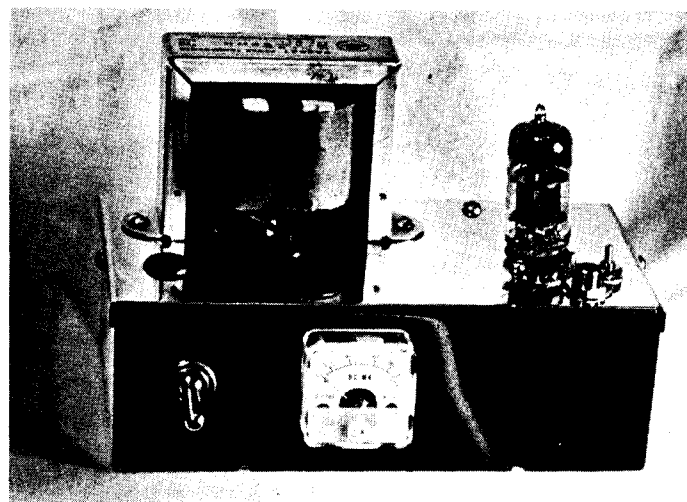
The biggest single offender or largest producer of noise is the vacuum tube. There are, however, other sources of noise that can be almost as damaging as that produced by the vacuum tube. Starting with the latter, one distinct form of noise is present in almost all equipment. This is resistive element or **Johnson** noise. The theory behind this particular form of noise is based on the fact that all resistive devices produce a certain amount of noise when operated at a temperature other than absolute zero. Since resistive devices can mean many things, consider those most applicable such as the resistance of the antenna, a carbon resistor, the resistance in a piece of wire.

To explain **Johnson** noise further, as electrons flow through any form of heated conductor they are displaced a very small amount in space due to agitation of the molecules in the conductor. Another, more common name for this phenomena is Thermal Agitation Noise. Bandwidth is another factor effecting this type of noise and the wider the bandpass of the equipment involved the higher the generated noise voltage will be.

Eliminating **Johnson** noise is not normally considered as a function of design since the only effective means would involve refrigeration of the various resistive elements. A secondary remedy is, of course, to reduce the overall bandwidth of the equipment. This is not practical when dealing with TV signals.

The noise generated by the vacuum tube is, as previously mentioned, of greatest concern. The magnitude of the noise voltages generated by the vacuum tube is much higher than from any other single source at the VHF frequencies. When dealing with the various tubes one must deal with different noise

problems. The most noise free tube, neglecting specific Gm's, is the triode. It has a lower noise component by virtue of the fact that it does not have partition noise problems. Partition noise is an added noise source inherent in any form of multi-grid tube. It is caused by the uneven distribution of electrons between plate and screen. This noise can be reduced to tolerable levels by using proper multi-grid tubes designed effectively for minimum partition noise generation.



TVH test pre-amp using Amperex's 7788 tube.

Number one offender in the vacuum tube is shot noise. This noise is generated because the cathode of the tube cannot emit the same number of electrons from instant to instant. The result is a minute random change in current flowing through the plate load. Hence, we have shot noise. In discussing shot noise, it is convenient to relate it to an imaginary resistance whose noise voltage (thermal agitation) is equal to the shot noise generated by the tube. The common definition for this resistance is R_{eq} or equivalent noise resistance. This concept is used for engineering and design purposes since the engineer must have something tangible when analyzing circuits.

In mathematical analysis of shot noise, one single factor becomes apparent. The amount of shot noise generated by a vacuum tube can be reduced by using a tube with high transconductance.

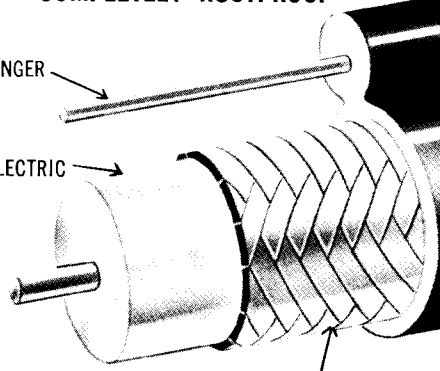
Induced grid noise is another vacuum tube created noise to be considered. This is a separate problem that can be very difficult to analyze and do very much with. The definition of induced grid noise is quite involved. Primarily, the effect of an electron moving from cathode to plate causes a variation in the electric field about the grid thereby inducing a

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FIGURE 8 CONSTRUCTION — E-Z SLITTING

VK108M — SINGLE SHIELDED
VD108M — DOUBLE SHIELDED

TYPE	O.D. (NOM.) Inner Cond.	O.D. (NOM.) Dielectric	O.D. (NOM.) Shield	O.D. (NOM.) 2nd Shield	O.D. (NOM.) Jacket	Attenuation Channel 6 (db/100 ft.)	Attenuation Channel 13 (db/100 ft.)	Shipping Weight Lbs/M Feet
VK108M	.081	.373	.389	—	.470 x .700	1.01	1.6	127
VKD108M	.081	.373	.389	.400	.470 x .700	1.01	1.6	143

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noise current in the input impedance.

Several variables are involved in calculating induced grid noise. Transit time effects and bandpass are two of the most important factors. By choosing specific tubes, the transit time effect can be minimized. However, since we are dealing with essentially wide bandpass systems, not much can be done to alter induced grid noise effects due to bandpass without sacrificing video quality.

IMPROVEMENT

Stacking this all up, it is not hard to see why snow is with us. All of the noise problems can be said to exist in the front end since the relative magnitude of the noise sources here and the signal levels here are fairly low in terms of microvolts. This leaves all improvements to the head end equipment unless the signal levels are just so low that they can't override the noise levels of the various line amplifiers. This then would be a case where more amplification at the head end is necessary before feeding the main line.

Reaching way down in the low microvolt levels for a weak TV signal is not a particularly good idea. There are instances though, where borderline reception exists and times when a "several" hundred microvolt signal from a TV station may dip to less than a hundred microvolts. Rather than allowing snow to develop, it would be a good idea to use a better front end and keep the signal clean. Once a snowy picture is passed on down the line nothing further can be done to improve it and most probably by the time the subscriber receives the signal it will be a little worse yet. Those few communities which have a sub-standard grade of signal at the head end site can benefit by using equipment with a minimum amount of self generated noise.

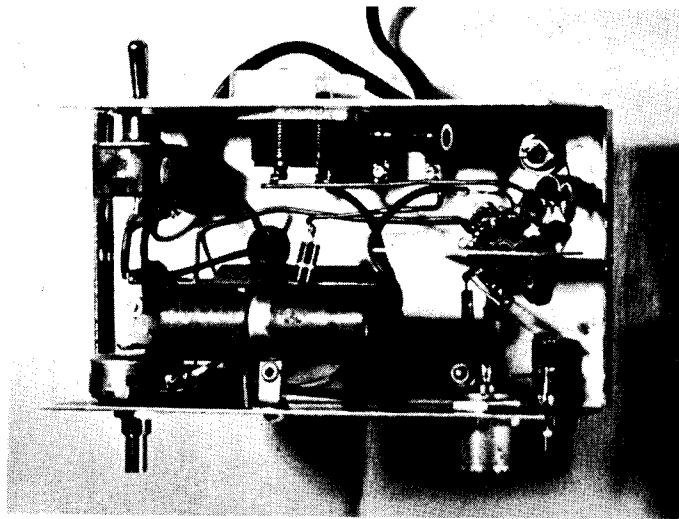
To illustrate the important part that the vacuum tube plays, consider the following:

Tube Type	Req	Generated Shot Noise
6AU6	2,660	17 uv. (pentode)
6AG5	1,650	10 uv. (pentode)
6J6	470	6 uv. (triode)

These figures show noise component from only one single source (shot noise).

PREAMPLIFIERS

The use of low-noise preamplifiers is highly recommended where signal improvement is desired.



Bottom view of TVH test pre-amp.

The overall effects are best demonstrated by actual comparisons on-the-air. Surprisingly enough a good pre-amp can make a world of difference. A lot of the newer tubes now available are perfectly capable of supplying considerable amplification with little increase in noise. Some of them show a generated shot noise level of only a microvolt and correspondingly most of the other noise currents are low.

It might be well at this point to mention line loss between the receiving antenna and the pre-amp. Unless the loss is kept down to as low a level as possible (short runs of co-ax) the system noise can be actually increased. Where long runs of co-ax are unavoidable, the pre-amp should be installed at the antennas. To effectively illustrate this condition, a loss of 3 db in the antenna transmission line will almost double the system noise.

Figure 1 shows a very workable Nuvistor pre-amp that has been tried and is being used with considerable success. Besides providing low noise, the tube has a gain of 12-15 db in single channel application. The circuit used is a conventional neutralized triode and is not difficult to adjust. Reliability is no problem with the Nuvistor, due to its rugged construction.

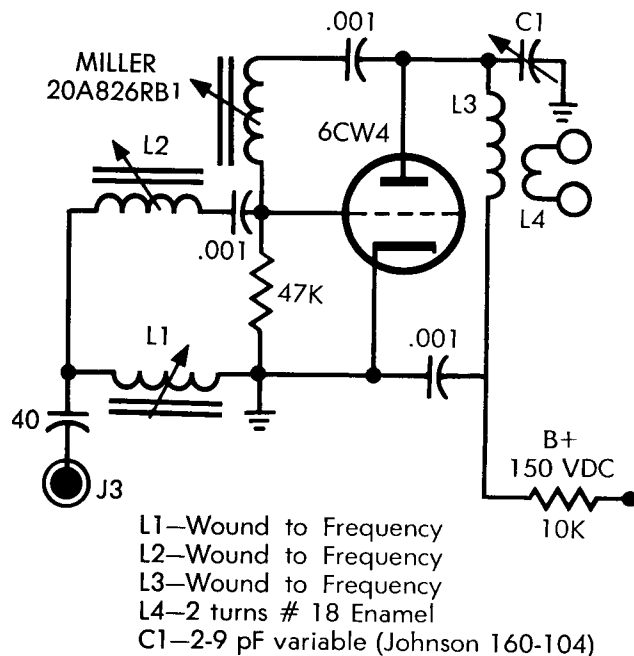


Figure 1 — Nuvistor Preamplifier

Another tube that exhibits excellent noise, gain characteristics is the 7788/E810F. As reported in the August issue of TV HORIZONS, this particular tube has been thoroughly evaluated and tried in a test pre-amp assembly. Since that time several pre-amp versions have been built and tested, all with excellent results. Figure 2 is a schematic of the 7788 pre-amp as built and used by the TVH staff. Since the tube is somewhat different from the conventional pentode, a word or two about its use is in order.

Bias is the most important item in using the 7788. Analysis of the tube's characteristic curves show that a bias change of 1/2 volt will result in a plate current change of over 20 mA. Due to this rather rapid change of plate current with a relatively minor change in bias, it is recommended that a stable fixed bias source be utilized. Considerable success has

EMCEE LOW NOISE PRE-AMPLIFIER

Best Signal

EMCEE introduces the lowest noise pre-amplifier presently available in the industry. The LPA is specifically designed for single channel operation where pre-amplification with the lowest possible noise is required.

The high reliability LPA transistorized pre-amplifier is powered through the coaxial signal cable from a separate power supply located at the termination of the cable into the receiving equipment. Thus, no external power lines are necessary. The

low transistor current drain enables the use of the Model LPA with any cable length. Cable attenuation of up to 10 db can be tolerated. And the full benefits of the extra low noise properties still realized.

A 6 db switch-controlled attenuator is provided at the power supply for situations where it is desirable to pad out the signal after amplification. Each LPA pre-amplifier is tested and guaranteed for noise figure, and a noise figure report is included with each LPA pre-amplifier.

SPECIFICATIONS

GAIN: 25 db minimum.

NOISE FIGURE: 3.5 db Max. Ch. 2-6, 4 db Max. Ch. 7-13.

FREQUENCY RANGE: Single VHF channel

OPERATING TEMPERATURE RANGE: -40 to +140°F.

POWER REQUIREMENTS: 115V AC

MOUNTING: Weatherproof — straps to TV mast or antenna.

CONNECTORS: 83-1-SP Coaxial (UHF) Connectors.

EMCEE

110V AC

AMPLIFIED
SIGNAL

ELECTRONICS, **M**ISSILES AND **C**OMMUNICATIONS, INC.

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Gentlemen: Dept. 0

☐ Please send me full information on
Model LPA* Transistorized Low
Noise Television Pre-Amplifier

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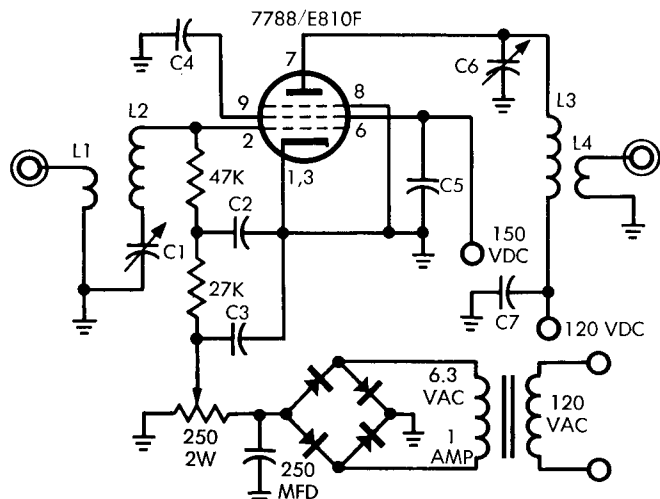
CITY _____ STATE _____

been had with the bridge rectifier system that is used in the pre-amp.

In actual pre-amp operation, the 7788 should be supplied 120 VDC, plate voltage, and 150 VDC, screen voltage. These voltages in conjunction with a bias voltage of -1.9 VDC, will result in plate and screen currents of 35 mA and 5 mA respectively.

It is also essential to over-couple the input and output links to achieve the necessary bandpass. This is best done by inter-winding the repective links with the resonant networks in the grid and plate circuits of the tube. Slight readjustment of the coupling factor can be made then to accurately adjust the bandpass.

If the 7788 type pre-amp is used in your system, stand back for an unbelievable improvement.



COIL AND CAPACITOR DATA

- L1—2 turns No. 22 hookup wire interwound on cold end of L2
- L2 & L3—Wind to frequency with #18 Enamel, spaced wire dia.
- L4—1½ turns No. 22 hookup wire interwound on cold end of L3
- C1—2.9 pF variable (Johnson 160-104)
- C2, C3, C4, C5, C7—.001 mf button capacitors (Sprague BH-140)
- C6—3-11 pF variable (Johnson 160-107)

Figure 2 — 7788/E810F Preamplifier

NOISE GENERATORS

Although the noise generator does not find too direct and application in the wide-band field, it can nevertheless afford some aid. Since we are primarily dealing with a very wide bandpass in most of our equipment, we can not use the normal techniques such as careful alignment of amplifiers for best noise figure. To do so would probably alter the bandpass characteristics of the equipment.

The noise generator can be used for checking systems and detecting faults which can be corrected. Even in some cases where the bandpass characteristics are wider than necessary, the noise generator can be used to touch up the system. Using the noise generator for finding system faults such as poor coax or flat amplifiers will make the effort of building one worthwhile.

The simplest noise generator to build and use is the solid-state type. The actual noise agent can be a silicon diode, reverse biased, which is terminology for connecting one up the wrong way. A reversed biased silicon diode will give you all the noise you can use plus some. The disadvantage of this type of noise generator lies in the inability to calibrate it

without laboratory equipment besides the fact that its characteristics change with temperature. It is very good for comparative purposes, however, and will serve well in this capacity.



This type of picture can be improved by application of a low-noise pre-amp.

The best diodes for noise generating purposes are the 1N21 or 1N23 "microwave diodes." They are quite rugged and require little in the way of source voltage. Germanium type diodes are not satisfactory for this purpose along with some of the silicon varieties. To get back to reverse biasing, this is only a matter of connecting the source voltage so that the diode's anode is connected to a negative source.

Figure 3 illustrates a simple noise generator using a 1N21B diode. The connections marked "M" are for the insertion of a suitable meter capable of measuring milli-amperes. It is important that the reverse current through the diode be checked and the pot marked to prevent a diode current flow of more than 4 milli-amperes.

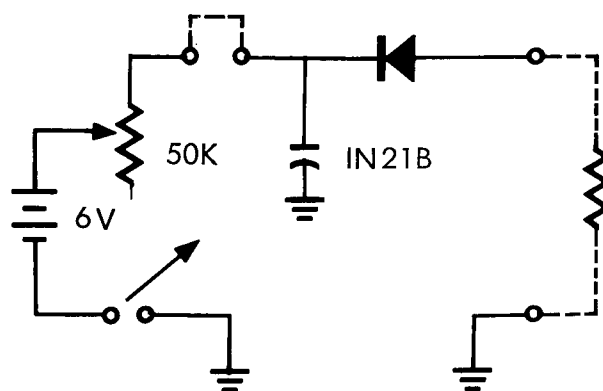


Figure 3 — Silicon diode noise generator.

When wiring the noise generator, be sure to keep the output lead from the diode as short as possible. Also, it is recommended that a suitable non-inductive carbon resistor be connected across the output terminals. For instance, if the generator is being used on equipment having an input impedance of 300 ohms, connect that value of resistor across the output terminals.

To use the noise generator for comparative purposes, connect it to whatever equipment you are checking and adjust the pot until a measurable noise output is seen (an increase above the residual noise). Then connect the generator to another identical piece of equipment and see what increase in noise is apparent. If the gain of the two units being evaluated is equal or close to being equal and one exhibits less increase in noise, you have your answer.

When checking non-identical pieces of equipment, be sure the gain of each is the same or the measurements will be worthless. Likewise, when checking the specific units don't change the setting of the pot on the noise generator and feed the generator into identical impedances.

A better noise generator can be built around the Sylvania 5722 temperature limited noise diode. Noise measurements with this type of diode are considerably easier and more accurate since the anode milliammeter can be used to compute the noise output. To measure the noise figure of any particular piece of equipment, the output noise power should first be measured and then the noise generator turned on and adjusted until the noise output power from the equipment is doubled. The noise figure of the equipment may be computed with the following equation:

$$\text{Noise Figure} = 20 I_p R$$

(I_p = Diode plate current)
(R = Terminating resistor)

Figure 4 shows the schematic of a 5722 temperature limited diode noise generator useful throughout the TV bands.

The use of this type or any type of noise generator is invaluable to any system and also will serve to point out where the noise problems lie.

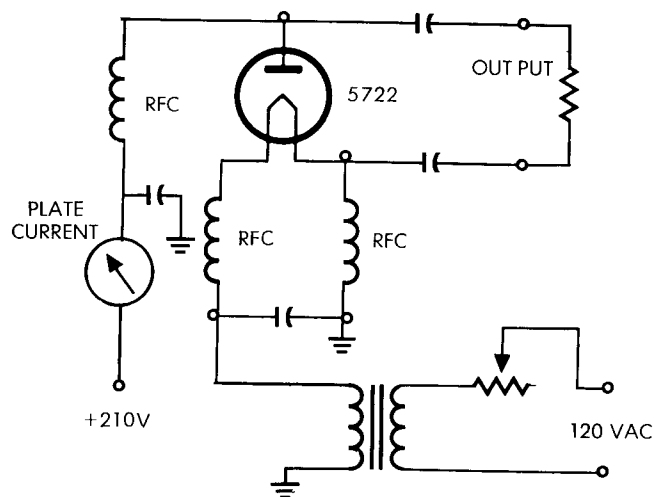


Figure 4 — Noise generator using temperature limited diode.

To summarize, the basic improvements that can be made to reduce noise are limited to the vacuum tube. This is in essence the only way that any overall noise reduction can be obtained. During the past year, better and better tubes have been developed. The future can produce even more radical changes, and system subscribers ultimately will benefit.

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Less than \$500 per channel! Includes Conrac Tuner and CAS TV Modulator-TVM. Composite modulation of video and 4.5 MC sound. Rack mounting, self-contained power supply, vestigial side band filters & RF amplifiers. Only 4 tubes, designed for continuous operation with lowered filament voltage for long tube life, lowered maintenance. Alternate 2 TV channels with addition of time clock & TV tuner only.

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OUR MAN IN EUROPE

GORDON J. KING
Assoc. Brit. I.R.E.
Brixham, Devon, England

Apart from the larger type of coaxial relay system, we get quite a call over here for the smaller type of "shared aerial" or communal system to cater for up to about 500 viewers in blocks of flats and housing estates. There are a number of manufacturers who specialize in the design and development of this kind of equipment, as distinct from the larger stuff for town-sized systems.

On the smaller networks we usually put over two television programmes and three or four FM sound programmes using "neat" carrier frequencies. We thus distribute direct on the local channels of Bands I, II and III. To date, we have two main television programmes sources from the BBC and ITA, with the former giving in the main the same programme from all transmitters, while the latter often varies its programmes to have maximum appeal in local areas.

This means, then, that a coaxial system could put over more than two television programmes if the master aerial can be sited to receive one or more distant ITA station in addition to the local BBC and ITA stations. In the past this has often happened on the larger type of system, but it is not encouraged by the Post Office, and it is now stipulated that only those ITA programmes which are "local" to the area may be piped (but sometimes two ITA programmes can be considered as "local" to the area!).

On shared aerial systems, therefore, two television programmes invariably satisfy the viewers (and the Post Office). Shared aerial systems are now being encouraged — and often stipulated — by housing estate controllers and local authorities to avoid the mushroom growth of roof-mounted aerials. Indeed, on some estates and flats outside aerials are not permitted, and since the signal field is not always sufficient to provide reasonable reception on indoor aerials, the only solution is a shared aerial system.

In cases such as this, the estate controller either purchases the system outright and rents signal outlets to his tenants or the firm responsible for the installation obtains its revenue, and capital costs of the system by itself charging the viewers weekly for the service it provides. This can be a very economical arrangement when outside individual aerials are prohibited, for then almost one hundred per cent participation is assured.

Incidentally, the costing of a larger system is based on 40 per cent participation in relation to the number of houses wired.

DUAL-CHANNEL AMPLIFIERS

Resulting from the demand for the smaller shared aerial system, dual-channel amplifiers have been evolved specifically for such applications. These use two, three or four stages, depending upon the gain required (from about 20 to 50 dB), and are designed to be responsive over one television channel in Band I and one television channel in Band III.

This is achieved by cascading Band I and Band III tuned circuits in the control grids and anodes of the valves, as shown in Fig. 1. Here coils L1 and L4 are tuned to the Band III channels and coils L2 and L3 to the Band I channel. On the top band, the low band coils offer a relatively low impedance to the signals, while on the low band, the high band coils bypass the signals without undue attenuation.

In this way, therefore, it is possible to secure almost full gain of a single stage on two separate channels, and this goes a long way towards enhancing the economics of a shared aerial system. Such amplifiers give an output in the region of 100 to 150 mV on each of the four carriers with an inter-modulation margin to allow the cascading of four or five, three or four-stage amplifiers without the intermodulation at the end of the system falling below 46dB.

A manual gain control arrangement is usually incorporated on the Band I channel, so that this may be balanced against the fixed-gain maximum of the Band III channel, having in mind the greater attenuation of the network cable at top band frequencies.

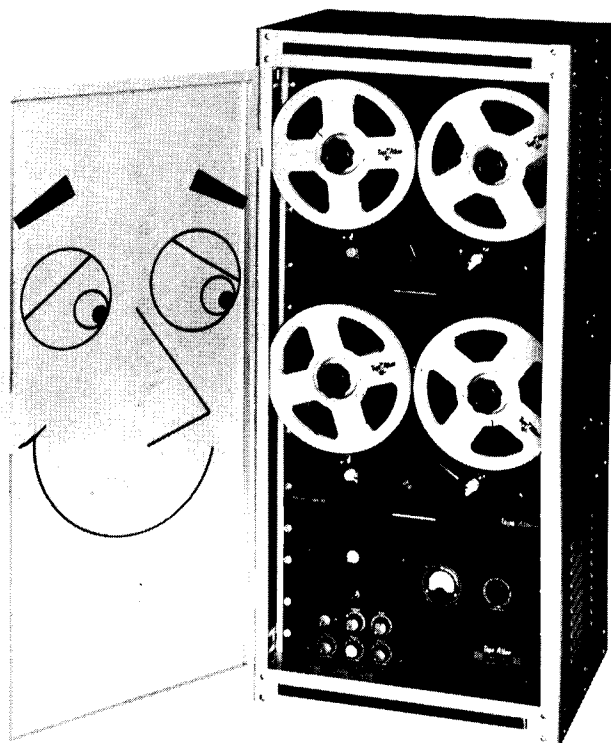
The system is made "live" to Band II simply by co-siting three or four-stage Band II repeaters with the two-channel TV repeaters. The Band II amplifiers are wide over the whole of the FM band and are adequately able to produce four FM carriers at levels up to 100 mV if required.

Generally speaking, there are three different FM programmes in Great Britain, all originated by the BBC, and as a selling "gimmick" an extra FM carrier is often added to a coaxial system. This is produced by a carrier generator at the head end, and the modulation is usually that of a very popular Continental station operating on the MW broadcast band. Thus, users of an FM-only receiver are able to obtain three BBC FM sound programmes plus the FM-ed Continental station on a coaxial system, while off-air FM listeners have only the choice the BBC programmes. At the present time, we are prohibited from piping closed-circuit programmes of any sort.

SPECIFICATIONS

Shared aerial systems are being developed to a fine art, and there are several specifications laid down by local authorities and estate controllers which have to be heeded by the installers of such systems. The Post Office have been responsible for certain

Custom Tailored for the CATV Operator!



Whether or not you already know the advantages of offering *background music* to your subscribers — don't fail to look into Tape-Athon's new Librarian. Here's a completely automatic tape player made especially for CATV systems.

It plays continuously, without attention, and reverses itself automatically at the end of a tape. An exclusive push-button intersperser also allows pre-selection of music sequence, guaranteeing non-repetitious programs. If you're using other music sources now, here's a way to eliminate record-changing, radio commercials, and other undesirable distractions.

Tape-Athon, under a convenient leasing plan, also supplies an almost endless source of selected music tapes, and rotates them monthly to assure a fresh supply of music. Each tape plays 8 hours so the twin decks hold 16 hours of music — about twice the library of a typical FM radio station.

Tape-Athon Corp.

522 South Henry
Chicago, Illinois 60606

safety regulations, such as related to line power voltage, subscriber isolation, signal levels, radiation limits and so forth. But the local authorities and estate controllers are now themselves specifying certain factors.

One recent one is that there must be a simple means of changing over to "standby" working in the event of failure of the main head-end. As shared aerial systems are relatively small, they are usually designed for unattended service, but as there is usually a janitor or caretaker responsible for the block of flats or housing estate. The changeover arrangements must, therefore, be suitable for operation by unskilled staff.

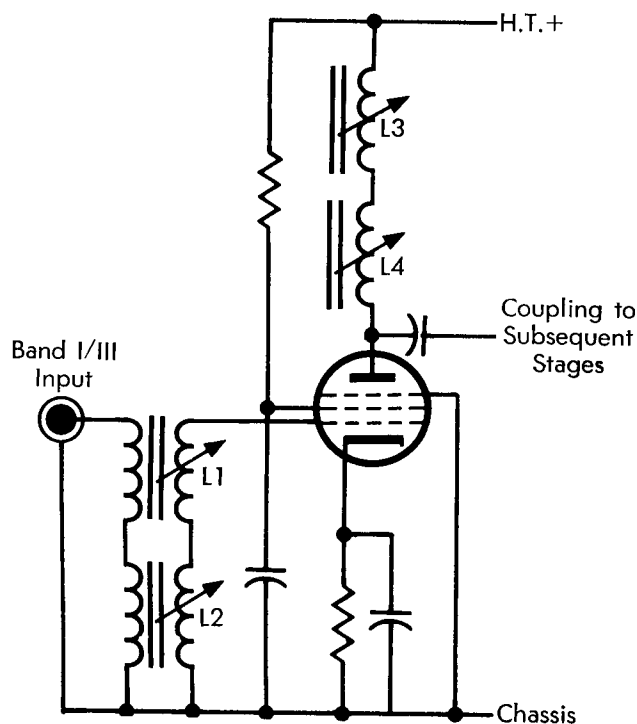


Figure 1 — Basic dual-channel amplifier circuit designed for shared aerial systems.

One way that we have overcome this problem is shown in Fig. 2. Here is shown two head systems — the "main" and a "standby". These are complete within themselves and are combined by a "star" network or similar kind of filter to feed the outgoing lines. Normally, the "main/standby" changeover power switch is in the "main" position and only that headend system is operating. In the event of a failure here, the janitor simply flicks the switch over to the "standby" position, thereby removing power from the main system and applying it to the standby equipment.

This method avoids the complications of switching coaxial and signal carrying circuits, and the "main/standby" changeover switch can be positioned, if required, well away from the amplification equipment, in the caretaker's office, for instance.

If two complete sets of aerials are not required, the aerials themselves can be coupled to the two head systems by simple splitting filters — each band aerial feeding both the main and standby amplifiers. There is an inevitable signal loss at the aerial terminal, of course but as this is only a matter of a few

decibels it can usually be tolerated. The same applies to the small loss introduced by the star filter to combine the two systems.

ADJACENT CHANNEL SELECTIVITY

On our larger coaxial systems the number of channels which we can carry is not so much limited by the system proper but by the adjacent selectivity shortcomings of the receivers connected to the system. The problem is resolved by something of a compromise. We either leave a space of one channel between the channels distributed or we shift the carrier frequencies a little to give a greater than natural separation between channels. On the low band, for example, we can get four channels in out of the five by using Channels 1 and 2 at their natural frequencies (this is possible over here because we have a greater than normal frequency separation between those channels since Channel 1 used to carry a double-sideband picture signal in the far off days), missing Channel 3, dropping Channel 4 down 1 Mc/s and lifting Channel 5 up to one Mc/s.

The 1 Mc/s deviations on Channels 4 and 5 can usually be accommodated by retuning the receivers connected to the system.

I discussed this problem with one of your Canadian operators — Mr. W. S. Thomas, President of the Northwest Television Systems Limited of Horseshoe

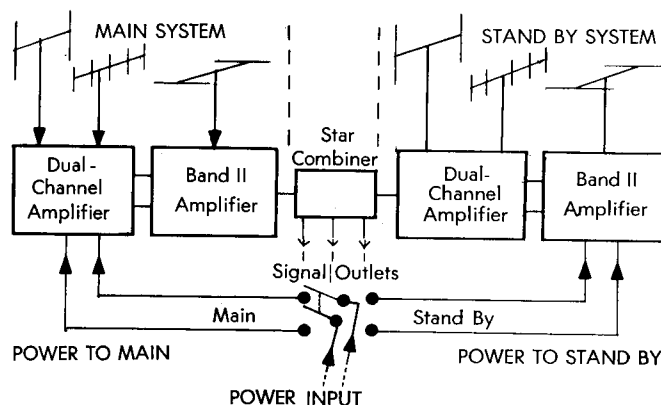


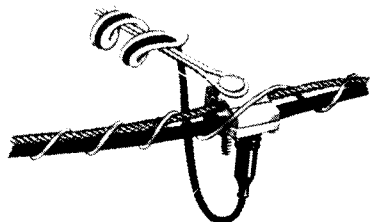
Figure 2 — Main/standby changeover system.

Bay, B.C. — during his recent visit here at Brixham, and I was extremely interested to hear that you are sometimes able to solve the problem on the low bands by employing sharp cut-off filters at the head-end. So far as I know, this method has not been tried over-here — yet. But steps are now in hand to find out how it works on our local network.

I must say that it was very pleasant having Mr. Thomas call on me, and I am always pleased to meet CATV types from your side of the Atlantic any time they are passing through this country.

It is nice to know that, thanks to Telstar, our CATV networks can now be coupled together! We had remarkable transatlantic reception over here, with the picture definition almost equal to that from our local station. We are looking forward to more program interchanges by way of this medium.

CABLE



DROP

REMOTE POWER FROM FUEL CELLS

The Minnesota Mining & Manufacturing Company has just recently introduced a new device to the field of electronics that holds promise for all. The device is the new thermoelectric generator. Based on the principle of converting heat to energy, the generator features no moving parts, no maintenance, absolutely silent, lightweight, portable operation. In addition the units are unaffected by extremes of temperature which makes it a valuable ally for the remote antenna sites.

Heat is the only item which is essential in operating the thermoelectric generator consequently the units are designed to utilize the most economical fuels available. The all-metal radiant type burners require only a simple orifice change in order to use either natural, propane or butane gases.

Currently, four different models of the generator are available with the largest supplying 12 VDC at 1 Amp., when used with the voltage converter. Size of this unit is 14 1/4" x 10" x 15" and weighs only 29 pounds. Larger 30 and 60 watt units are being added to the line. Long life is assured by use of solid state thermoelectric couples, hermetically sealed and individually suspended for maximum shock protection.

400 MILE MICROWAVE SYSTEM

Television Station KOAT - TV, Albuquerque, New Mexico, is currently using a highly complex microwave relay system to carry Phoenix, Arizona, off-the-air signals, to Albuquerque. The system, an RCA installation, is capable of carrying color and uses only four repeater stations for the long hop.

Among the many features to improve maintenance is an automatic fault sensing unit to provide ready indications of trouble. Standby equipment is also available.

ADVERTISING YOU CAN'T BUY

A recent item published in the Poteau, Oklahoma News reflects the public's opinion of what CATV can and does offer. In describing his much improved T-Viewing, Editor Bob Lee Kidd, Jr., said it was stupendous, miraculous, amazing and downright wonderful.

Mr. Kidd's remarks are, of course, the type you cannot buy or solicit without actually providing a worthy service.

The credit for this achievement goes to Transwestern Video who recently inaugurated the CATV service in Poteau. The overwhelming approval given the system in Mr. Kidd's editorial pointed out the fact that indeed it was a relief to have a choice of fare rather than be a total captive.

Joe Davis of Transwestern Video is to be congratulated for his excellent public relations and likewise DAVCO for their construction of a good system.

TEN CHANNEL SYSTEM TO BE BUILT

Antennavision, Inc., is going to build an all-band CATV system in Globe-Miami, Arizona. The present system in this area delivers low band channels 2 thru 6.

Existing equipment will be replaced with new transistorized all-band equipment to handle channel 2 thru 13. First operations will begin within two to three months according to Mr. William Reynolds, General Manager for Antennavision's operations in Gila County. Work is presently well underway on the project.

A new microwave relay system will be utilized to provide the Globe-Miami subscribers with the increased service. In addition, Channel 7 will have a 24 hour time-weather - music service. Future plans also call for the addition of Channel 11, possibly.

This system will be truly built for the subscriber, with no increase in rates.

HYDE ELECTS JACK WALTER

Hyde Electronics Company, Inc., has recently elected Mr. Jack Walter, as vice-president of the firm.

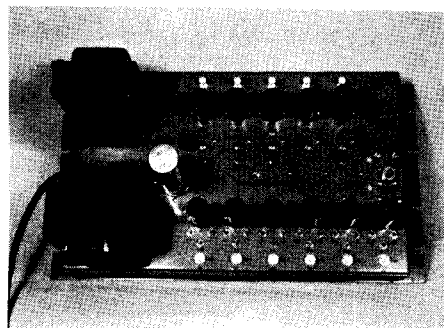
Mr. Walter, a graduate EE from the University of Colorado and a registered professional engineer, will head the Industrial Products Division at Denver and Salt Lake City.

ENTRON ANNOUNCES NEW PRODUCT

A new series of passive and electronic channel mixing devices has been added to the Entron line. Five low band and four high band channels can be combined in the new MUE-11 electronic mixer. This unit also features an FM input and an auxiliary input for a channel in the 162-168 Mc band.

A mate for the MUE-5 low band mixer can be found in the new MUH-4 electronic mixer, which has provisions for four high band and two FM inputs plus an input for coupling existing low band mixing equipment to the unit.

A passive mixer for adding high band channels to an existing low band system with a minimum of insertion loss is found in the new MUP-41. This unit has inputs to accept four high band channels and the output of an existing low band system.



Entron's new MUE-11 all-band mixer.

400 FOOT TOWER GOES WITH NEW SYSTEM

Starkville, Mississippi will soon have a new CATV system. Mr. Sam Phillips of Starkville TV Cable Company, Inc., stated that a contract had been signed with DAVCO Electronics Corporation for construction of the system.

The 400 foot tower for the receiving end will be the tallest structure in the area with its top over 800 feet above sea-level. Completion of the tower and antenna installation is expected within the next two weeks.

TAPE FOR TELEPROMPTER

Mr. Irving B. Kahn, president of TelePrompter Corporation, has stated that negotiations are currently underway to acquire the Conley Electronics Corporation of Evanston, Illinois.

Conley Electronics, manufactures and sells endless loop tape cartridges and related products compatible with TelePrompter's plans to expand into the tape industry.

NOTE:

This portion of Television Horizons is set aside for news of the industry as contributed by system planners and system managers. The convenient monthly reporting form, found on a perforated card in the back of TV Horizons this month, is designed to provide TVH with the data necessary to keep others informed of your activities during the past 30 days. Why not make it a regular point to fill in the card each month and drop it into the mail. There is no better way to promote industry cohesion than sharing your progress with others.

The Editor

SYSTEM NEWS

Manchester Television Corporation says they have added Channel 9 to their system this month, according to J. J. Mueller, Manager. Further activity is now underway to add several FM channels to the system also.

Modern Radio Cable, Cambridge, Springs, Pennsylvania is currently building a new system in their home locale. Mr. R. C. Stine is heading the new system.

Saugerties, New York now has 370 subscribers on the system with a future potential of 1500. The system is currently all-band with plans for the addition of CCTV and FM.

Morehead TV Cable, Inc., Morehead, Kentucky. Mr. Arnold J. Pack, President, reports the addition of 24 new subscribers bringing the overall total to 496. Construction is now beginning on a new cable run, 5000 feet to be exact, to serve 150 new subscribers.

Paducah and Matador, Texas systems are being revamped to all-band specifications. The new systems will carry 7 channels when completed. Total number of subscribers to date, 650.

Irvine Community TV, Inc., Irvine, Kentucky has 4 new subscribers this month bringing the total to 277. Plans are underfoot to add 2-4 hours of Closed-Circuit TV to the system per day. The Irvine, Kentucky's sister system at McKee, Kentucky has been busy with the addition of a new BT MUC-11-6 converter and Jerrold WLA-88 line extender. The McKee system has also added 2 new subscribers this month. Total is now 180.

NOTE:

Don't forget to submit your system information cards this month. Let's hear about what you are doing in your community. An interchange of information is helpful to all.

Collier Community TV Company distributed the Patterson-Liston fight to six cities with a combined population of over 55,000.

DAVCO EXPANDS

Jim Davidson of DAVCO Electronics, Corporation, Batesville, Arkansas, is going to be serving the many CATV systems in the Oklahoma and Texas area.

DAVCO, a long-time member of the CATV fraternity, will be making calls and shipments to the systems in Oklahoma and Texas with emphasis on overnight delivery of Entron products and other allied lines.

*bring your picture in
out of the snow with*

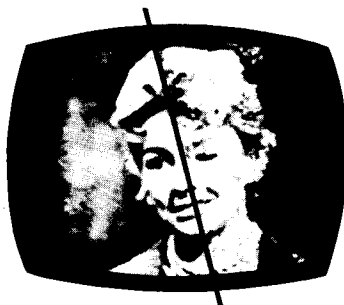
**CECO'S
UHF/VHF**

PREAMPLIFIERS

Ceco's ultra-low noise UHF and VHF preamplifiers effectively double transmitter power at the receiver site, eliminating entirely or reducing significantly snowy TV reception. These rugged, compact, single channel units have self-contained power supplies... advanced tube types and other components for long, trouble-free life. They require no cooling devices, are housed in easily mounted, weatherproof aluminum enclosures.

**Ceco manufactures complete
equipment for TV cable systems.**

Write for complete information.



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Engineering
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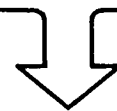
**NEW UHF STATIONS
Oil City, Pennsylvania**

Great Lakes TV Company has received a Construction Permit for a UHF station to operate on Channel 64. ERP's, 14.6 kw visual and 7.9 kw aural. The new TV facility will function as a satellite of WSEE-TV, Erie.

Jackson, Mississippi

McLendon Telecasting has been granted a Construction Permit for UHF Channel 25 in a recent FCC action. The new UHF station will be located at Jackson. Visual ERP will be 240 kw and aural ERP 120 kw.

**EXPERIENCE
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**BY OVER
\$27,000,000.00
IN SUCCESSFUL
CATV SYSTEM
SALES....IN JUST
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DENVER 6, COLO. — PH. DU 8-5888

In Canada: FRED T. METCALF
25 Crestwood Place, Guelph, Ontario
Telephone TA 2-2030

Lexington, Kentucky

An application for UHF Channel 40 has been filed by Bluegrass Broadcasting, Inc. Proposed ERP's are 420 kw visual, 210 kw aural.

Eau Gallie, Florida

Melbourne and Eau Gallie Broadcasting Corporation has applied for Channel 37. An ERP of 407.85 kw visual and 220.24 kw aural has been proposed.

Lima, Ohio

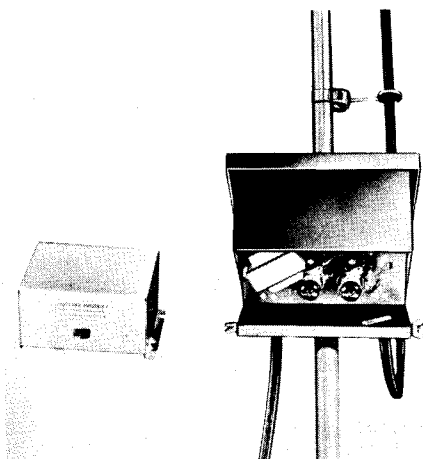
A Channel 73 assignment has been applied for by the Citizen Communications Company, Lima. ERP's proposed, 234.6 kw visual, 120 kw aural.

NEW UHF BOOSTER BY BLONDER-TONGUE

Blonder-Tongue Laboratories, Inc., which introduced the nation's first antenna-mounted broadband UHF booster, the Ultra-Booster, model UB, has now developed a series of five standard models of this device, each covering a portion of the UHF spectrum.

Like its prototype, the UB series amplifies signal voltage in weak areas, providing "snow" free reception on UHF channels.

The new home TV product consists of two units; a broadband amplifier; and a remote power supply.



A gain figure of at least 14 db on all UHF channels and an excellent signal to noise ratio are features of the new units. A professional Ultra Booster, Model UBP, is also available for MATV and CATV systems, listing at \$145.00. A custom model, UBC, offering a choice of UHF bandspreads as well as input and output connectors has also been developed. It lists at \$190.00.

KAISER INDUSTRIES CORPORATION

The Broadcasting Division of Kaiser Industries has applied for a number of UHF grants. UHF Channel 38 for Chicago, Illinois will

have a visual ERP of 200 kw and an aural ERP of 100 kw, according to the application. Other applications are for: Burlington, New Jersey, UHF Channel 41; Detroit, Michigan, UHF Channel 50; Corona-Los Angeles, UHF Channel 52; San Francisco, UHF Channel 44.

SPRINGFIELD, ILLINOIS MADE ALL UHF

The Federal Communications Commission handed down a decision on July 18 deleting the Channel 2 assignment from Springfield and assigning Channel 2 to both St. Louis, Missouri and Terre Haute, Indiana. This action effectively makes Springfield an all UHF area. In the same action the FCC assigned UHF Channels 26 and 36 to Springfield.

In commenting on the action, the commissioners felt that by continuing Springfield as an all UHF area, the public interest would best be served. This point was brought out in their report in clear and concise form. Their reasoning was based on the impact that a Channel 2 facility would have on the existing UHF stations and on future UHF development. Further, concern was shown towards the possibility that a VHF station would worsen the competitive situation.

PRELIMINARY UHF REPORT

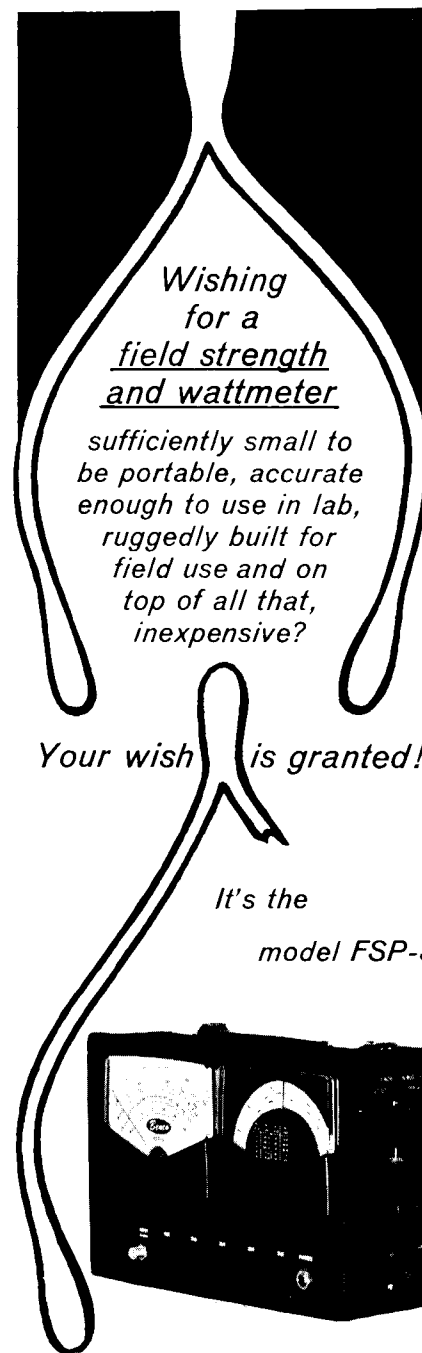
Project data from the New York City, WUHF-TV evaluation is beginning to be sorted and analyzed. The data, collected from 800 locations within a 25 mile radius from the transmitter site, thus far shows that the Channel 31 station is at its worse only a few percent different from its VHF counterparts. Additional data from more than 1800 locations in the test area is currently under evaluation.

B-T ANNOUNCES PORTABLE TV CONSOLE

A new, portable TV console for closed circuit systems has been developed by Blonder-Tongue Labs, Inc., Newark, N.J.

Called the Porta-Studio, model ST-1, the unit is easily wheeled from room to room. List price is \$5,950.00.

The unit was conceived as a miniature studio for schools and industry. It contains a transistorized camera and microphone, a modulator and channel 2-13 output selection. When combined with appropriate lighting and a 17 inch studio monitor, the ST-1 has all of the cables, connectors, switches and amplifier equipment to generate a full tv channel with both audio and video.



Wishing
for a
field strength
and wattmeter

sufficiently small to
be portable, accurate
enough to use in lab,
ruggedly built for
field use and on
top of all that,
inexpensive?

Your wish is granted!

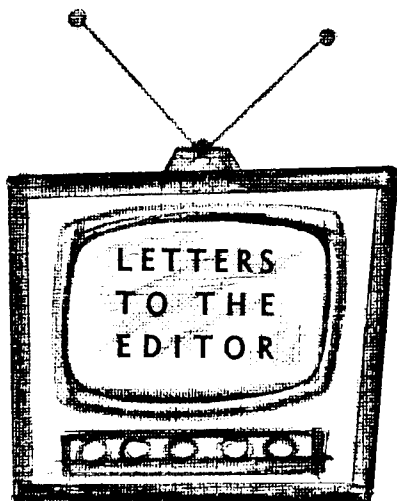
It's the
model FSP-3

Dimensions: 5 1/4" x 11 1/4" x 7 3/4" □ Weight: only 10 lbs. including batteries □ Sensitivity: 5 microvolts minimum readable signal or 60 m/v full scale with sensitivity control at maximum □ Selectivity: all spurious responses including image more than 80 db down, 4.5 Mc/s or more away from selected frequency □ Battery Life: 180 hours continuous or better than 3 hours per week for one year.

BENCO

Television Associates Ltd.

27 Taber Road, Rexdale, Ontario, CANADA
In U.S.A. Blonder-Tongue Laboratories, Inc.
9 Alling Street, Newark 2, N.J.



Gentlemen:

"Attached is my first check in the amount of \$5.00 for the subscription to your magazine. Your July issue sold us on the fact that we do have a publication which supports CATV. You can rest assured that future years will find us sending our annual check."

William Ridsen
Technical Director
Cumberland Television, Incorporated
Cumberland, Kentucky

Mr. Ridsen:

Thank you and I feel sure we will have a long and friendly association.
The Editor

"... when can we expect to see UHF become a predominant mode of TV transmission. We have watched with great interest, the current trend towards UHF, however, there is little information available to tell us what is going on."

Chuck Broten
Willow Springs TV Cable Company

Mr. Broten:

I suggest you read the information in this issue regarding UHF. It may help to explain a little of what has been happening.

The Editor

NEW CCTV DISTRIBUTION UNIT

Blonder - Tongue Laboratories, Inc., has recently completed development of a new video and RF distribution device for closed-circuit TV systems. Dubbed the Video RF Thru Line Switcher, this unit allows any one of the ten available inputs to be connected to a separate "switched input" terminal. The corresponding output will then be connected to a "switched output" terminal.

A typical use of the device is to combine a closed-circuit TV channel with off-the-air channels in a CATV system. It can also be employed as a 10-circuit video switcher. In this case, a video monitor may be switched into any one of the 10 circuits on a loop-thru basis.

Frequency range of the device is 0-216 Mc., with 75 ohm input and output impedances. The price of the Video RF Thru Line Switcher, Model VS-1, is \$500.00 net.

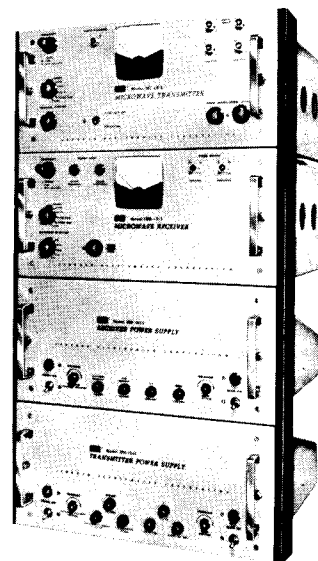
12 KMC MICROWAVE FROM JERROLD

Mr. Robert H. Beisswenger, Vice President and General Manager of Jerrold Electronics reports that a new line of wide-band microwave equipment for the 12 kmc region has been added recently. The new equipment, capable of handling wide-band video frequencies up to 8.0 Mc, as well as standard broadcast monochrome and color, can be also used to handle in excess of 600 voice channels in message system applications.

The high frequency stability of the equipment, to within 0.005%, is possible through the use of special discriminator circuits and quartz crystal reference oscillators.

This is maintained over a temperature range from minus 20 degrees Centigrade to plus 55 degrees Centigrade. Line voltage changes from 105 to 130 volts also will not affect the stability.

Both the 12 kmc and the standard 6 kmc equipment has been specially designed for stacking in a single rack to permit multi-channel operation without the use of additional duplexers or isolators.



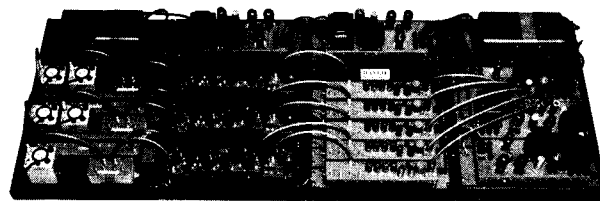
The new units provide front panel metering of all circuits and simple access to all parts of the equipment. Slide-rail mounts are used on the chassis to facilitate maintenance without disassembling the wave-guide. Model numbers of the new 12 kmc equipment are JMT-1013 and the associated power supply JTP-1013.

ONLY DAVCO OFFERS YOU "Functional Design Head-end"

HERE'S THE KEY TO GOOD
HEAD-END INSTALLATIONS . . .

THE SIGNAL STAYS AT RF . . . NO DE-MODULATORS AND MODULATORS.

Five adjacent channels in the low band, with complete control of the audio and video carrier levels. Primary AC power is regulated, DC voltages are electronically regulated, built in remote power supplies for antenna mounted pre-amplifiers, Hi-Q and band pass filtering for elimination of adjacent channel interference. The four racks are bonded together, equipment fully aligned and ready for service. All connecting cables are made up with double shield cable and BNC connectors. Overall dimensions are 34" deep and 84" wide. The rack slopes from 12" at the back to 2" at front. This type mounting aids in heat dissipation, which adds to the life of the equipment and reduces maintenance. All conversions are crystal controlled. Tubes are selected, long-life. DAVCO has assembled and delivered ten of these head-ends in recent months. Each one is custom designed for your system, and uses rugged Entron equipment. Call or write for information.



DAVCO ELECTRONICS

P.O. BOX 861 • BATESVILLE, ARKANSAS

on other horizons this month:

You know, there's just a chance that you might *not* know that we here at Horizons publish a number of other electronics specialty magazines. Just as TELEVISION HORIZONS covers the field of weak-signal television reception and the cable industry, our other magazines provide complete coverage of the non-broadcast communications field (including microwave), the history-making VHF/UHF ham radio area, and the fast growing CB radio industry. Here's what's appearing in the current issue of each of our other magazines on other horizons:



The October issue of Communications Horizons talks about the increasing interest in Selective Calling along with the inherent problems encountered in producing workable units; the story behind the use of crystal ovens plus the reasons for not using them in transistorized equipment; a tour of a well known antenna manufacturing company; and all the regular departments including Logbook, Milestones, and late word from Washington concerning FCC rule changes.



October's issue of VHF Horizons features the ins and outs of antenna construction and theory; a log-periodic feed for the 400-2500 Mc region and its associated parabolic reflector; some treatment of the antenna problems at 3300 Mc and up; antenna height for optimum sporadic E and ionospheric scatter propagation, and up to the minute news. In addition there are all the usual features including Scanning the Literature, TVI and VHF, late word from Washington, the Showcase, and Lab Reports.



CB Horizons for October is complete with a treatise on SSB and its possible applications; preamplifiers and their use with CB equipment; the addition of "S" meters; building a complete VTVM for universal use; audio compressors and what they can do for you. In addition to all the technical talk, there's a story about CB and its fight with Polio, and all the regular features such as CB in South America, the Showcase, Lab Reports, CCM contributions, and Channel 24.

It's been our experience that many readers of one of our magazines also have special interests in a field covered by another Horizons publication — yet don't know that the other magazines exist. If you would like a sample copy of the latest issue of any of these publications, together with either subscription or advertising data, just drop a postcard to Promotion Department, Horizons Publications, P.O. Box 1557, Oklahoma City 1, Oklahoma. We'll take care of it from there.

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Write to us about your present low band system. We'll be happy to offer you an ADABAND design exclusively for you. Also inquire about the all band design for new or existing systems. A complete, new catalogue and price list are available.